SECTION V

GUIDELINES FOR COST SHARED BEST MANAGEMENT PRACTICES

TABLE OF CONTENTS

Impervious Surface Conversion

Definition/Purpose

Impervious surfaces are covered by impenetrable materials such as asphalt, concrete, brick, and stone. These materials seal surfaces, repel water and prevent precipitation from infiltrating soils. Removal of these impervious materials, when combined with permeable pavement or vegetation establishment, is intended to reduce stormwater runoff rate and volume, as well as associated pollutants transported from the site by stormwater runoff.

Policies

1. Practice must be combined with vegetation establishment or permeable pavement installation.

2. When vegetation is to be established on site, practice should be initiated as closely as possible to the optimum time for vegetation establishment.

3. Temporary conservation cover must be established within 14 calendar days if permanent vegetation cannot be established.

4. Vegetation establishment must include proper soil preparation. Deep tillage using a chisel plow, ripper or subsoiler may be required to address soil compaction. Addition and incorporation of topsoil or organic matter may be necessary for proper seedbed establishment.

5. A Sedimentation Erosion Control Permit may be required.

6. Removal of impervious surfaces adjacent to waterways should be given funding priority.

7. The impervious surfaces to be converted must have been installed for three years or more to be eligible for cost share assistance.

8. If the impervious surface (ex. parking lot) is temporary in nature, review the Division of Land Resources Sediment and Erosion Control Plan and any local ordinances to see if either may require removal of temporary surfaces or limit the amount of impervious surfaces on the property. If the temporary lot is required to be removed or removal is necessary to meet impervious surface caps, the project is not eligible for cost share assistance.

9. This practice shall not be used to offset the expansion of impervious surfaces on the same property or property under the control of the same applicant.

<u>Specifications</u>

N.C. NRCS Technical Guide, Section IV, Specifications #612 (Tree and Shrub Establishment), #342 (Critical Area Treatment)

Permeable Pavement

Definition/Purpose

Permeable pavement is an alternative to conventional concrete and asphalt paving materials that allows rapid infiltration of stormwater. Stormwater infiltrates into a porous paving material that provides temporary storage until the water infiltrates into underlying permeable soils or through an underground drain system. This practice is intended to reduce stormwater runoff rate and volume, as well as associated pollutants transported from the site by stormwater runoff.

Policies

1. Practice must be combined with impervious surface removal. Surface area of permeable pavement to be cost-shared shall not exceed the portion of impervious surface removed.

2. The soils beneath the permeable pavement must have sufficient infiltration capacity for the permeable pavement to drain.

3. The site must be located in the Sand Hills or Coastal Plains physiographic regions, including all barrier islands (refer to the map on following page). An exception to this requirement can be made on a case-by-case basis for sites in other areas of the state if soil within a one-mile radius of the site is classified as coarser than loamy very fine sand for the top three feet as defined by the USDA-NRCS.

4. Practice should be sited away from construction or other activities that can produce sediment-laden runoff. Soil clogs permeable pavement, making it ineffective.

5. Practice must be installed and maintained in accordance with manufacturer's specifications.

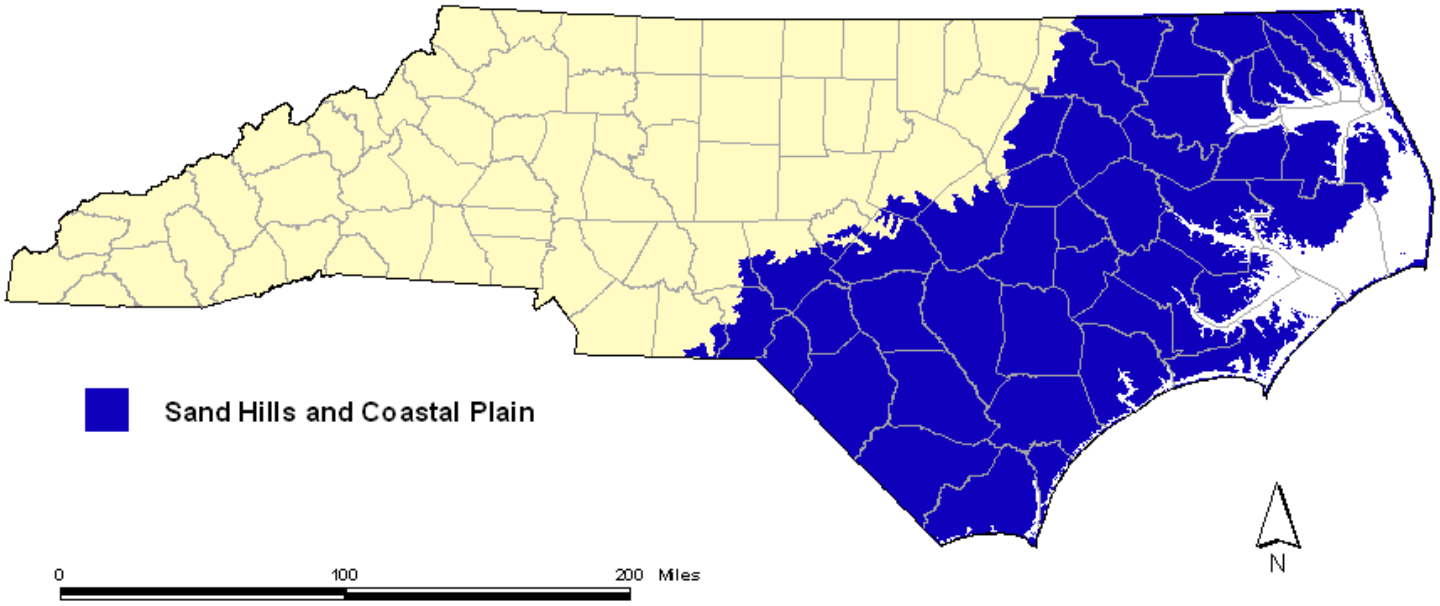
6. An operation and maintenance plan for the site must be developed and implemented.

<u>Specifications</u>

NCDENR. 2005. *Updated Draft Manual of Stormwater Best Management Practices*: *3.10 Permeable Pavement*. Raleigh, NC. Department of Environment and Natural Resources-Division of Water Quality

The Sand Hills and Coastal Plain physiographic regions of North Carolina.

Source: N.C. DWQ Stormwater Best Management Practices (BMP) Design Manual, 2006



Grassed Swale

Definition/Purpose

A *grassed swale* is a natural or constructed channel that is shaped or graded to required dimensions and established in suitable vegetation for the stable conveyance of runoff to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

Policies

1. This is a sediment control practice and must not be used if the primary purpose is to drain wet areas.

2. As a condition for cost sharing, the contributing watershed draining into the waterway must have installed, or the cooperator must agree to install as part of the agreement, erosion control measures necessary to prevent damage from washout or excessive sedimentation in the waterway.

3. Land smoothing for grassed waterways is intended for use only where existing terraces, diversions or other minor landscape features must be removed prior to initiating a grassed waterway system.

4. All NRCS standards and N.C. Community Conservation Assistance Program policies relative to vegetation must be followed.

5. BMP soil, nitrogen and phosphorus benefits are required on the contract.

6. This practice shall not drain directly into Shellfish (SA) Waters.

7. If the swale meets any of the following conditions, it must be designed by a Professional Engineer:

    a. The 2 year storm velocity is greater than 2 feet per second.
    b. The 10 year storm velocity is greater than 5 feet per second.
    c. The drainage area is greater than 2 acres.

<u>Specifications</u>

N. C. NRCS Technical Guide, Section IV, Specification #412 (Grassed Waterway).

NCDENR. 2007. *Stormwater Best Management Practices Manual*: *Grassed Swales, Chapter 14*. Raleigh, NC. North Carolina Department of Environment and Natural Resources-Division of Water Quality.

Critical Area Planting

Definition/Purpose

A *critical area planting* means an area of highly erodible land that cannot be stabilized by ordinary conservation treatment on which permanent perennial vegetative cover is established and protected to improve water quality. Benefits may include reduced soil erosion and sedimentation.

Policies

1. All NRCS standards and N.C. Community Conservation Assistance Program policies relative to vegetation must be followed (see Section V for guidance).

2. If concentrated surface water is identified as a cause of the degradation in the critical area, it shall be (a) temporarily or permanently diverted from the site during the establishment period, or (b) adequately handled through the use of erosion control mats, netting or other means.

3. If vehicular, human or animal traffic is identified as a cause of the critical area, then appropriate practices or measures shall be installed to mitigate these factors prior to planting.

4. Existing established vegetation should not be removed, unless its presence interferes with establishing desired vegetation for stabilizing the area.

5. Special caution must be used on vegetation selection for steep slope areas. Trees are allowed, but must be planted to not cause shading and increase erosion. Alternatives include: sod, compost socks, shrubs and native grasses/wildflowers.

6. Soil amendments and/or compost may be required to increase organic matter or soil permeability for sites with poor soils.

7. Vegetation shall be established using the NRCS critical area planting standard (NC FOTG 342), including the shaping of the site as needed to eliminate gullies, seedbed preparation, liming and fertilization according to a soil test, the selection of plant species adapted to the site and intended use, and mulching.

<u>Specifications</u>

N. C. NRCS Technical Guide, Section IV, Specification #342 (Critical Area Planting), #472 (Access Control)

Bioretention Areas

Definition/Purpose

Bioretention is the use of plants and soils for removal of pollutants from stormwater runoff. Bioretention can also be effective in reducing peak runoff rates, runoff volumes and recharging groundwater by infiltrating runoff.

Policies

1. Bioretention areas are intended to treat impervious surface areas of greater than 2500 ft^2. Refer to backyard rain garden practice if treating less than 2500 ft^2.

2. The seasonal high water table must be at least two feet below the proposed bottom of the facility.

3. Bioretention facilities may be constructed using native soils when the soil infiltration rate is at least 1 inch/hour. Installation in clay soils will require an imported soil mix and underdrains to achieve the minimum infiltration rate.

4. In draining to nutrient sensitive waters, the bioretention facility shall utilize a soil media with a P-Index between 15-40 to promote phosphorus removal.

5. Grassed swales, filter strips, or other structural practices such as forebays should be considered as a method of pretreatment to reduce sediment loading.

6. Native plant species capable of tolerating the extreme moisture conditions typical of this practice should be specified over non-native, invasive, or exotic species that require excessive care.

<u>Specifications</u>

N.C. DENR. 2005. *Updated Draft Manual of Stormwater Best Management Practices*: *3.2 Bioretention*. Raleigh, NC. North Carolina Department of Environment and Natural Resources-Division of Water Quality

Hunt, W.F. and N.M. White. 2001. *Designing Rain Gardens /Bioretention Areas.* North Carolina Cooperative Extension Service Bulletin. Urban Waterfronts Series. AG-599-3.

Hunt, W.F. and W.G. Lord. 2006. *Bioretention Performance, Design, Construction and Maintenance.* North Carolina Cooperative Extension Service Bulletin. Urban Waterfronts Series. AG-599-5.

N. C. NRCS Technical Guide, Section IV, Specifications #393 (Filter Strip), #412 (Grassed Waterway).

Backyard Rain Garden

Definition/Purpose

A *rain garden* is a shallow depression in the ground that captures runoff from a driveway, roof or lawn and allows it to soak into the ground, rather than running across roads, capturing pollutants and delivering them to a stream. The rain garden absorbs and filters pollutants and returns cleaner water through the ground to nearby streams. Rain gardens can also reduce flooding by sending the water back underground, rather than into the street.

Policies

1. Rain gardens should retain water for less than three days after a storm event. If water poured into a hole dug one-foot deep is still there after three days (provided there has been no rain), the site should be designed as a backyard wetland or another site should be selected.

2. If this BMP is treating more than 2500 ft^2 of impervious surfaces or an underdrain is required for proper drainage, design approval is required by a Professional Engineer (PE). A Bioretention Area with engineered soils may be required.

3. Grassed swales or filter strips should be considered as a method of pretreatment to reduce sediment loading.

4. Native plant species capable of tolerating the extreme moisture conditions typical of this practice are recommended. Invasive or noxious species are prohibited, with the exception of all common turf type grasses.

5. See the CCAP Design Manual for more information.

6. The Rain Garden Checklist and Rain Garden Operation and Maintenance Plan are required.

<u>Specifications</u>

N.C. Cooperative Extension Service, *Backyard Rain Gardens*
(http://www.bae.ncsu.edu/topic/raingarden/Entire_handout.doc)

Stormwater Wetlands

Definition/Purpose

Stormwater wetlands are constructed systems that mimic the functions of natural wetlands and are designed to mitigate the impacts of urbanization on stormwater quality and quantity. Stormwater wetlands provide an efficient method for removing a wide variety of pollutants such as suspended solids, nutrients (nitrogen and phosphorus), heavy metals, toxic organic pollutants, and petroleum compounds.

Policies

1. Stormwater wetlands are intended to treat impervious surface areas of greater than 2500 ft^2. Refer to the backyard wetland practice if the area to be treated is less than 2500 ft^2.

2. Stormwater wetlands that are constructed off-line from intermittent and perennial streams and are explicitly designed for stormwater management, are not subject to the provisions of Section 401 and 404 of the Clean Water Act. However, if stormwater wetlands are abandoned or no longer used for their original purpose, they may be regulated as wetlands.

3. Measures to reduce high flow velocities and sediments and pollutant loads should be considered. Pretreatment in conveyance facilities (such grass swales), filter strips or other buffers may be effective.

<u>Specifications</u>

N.C. DENR. 2005. *Updated Draft Manual of Stormwater Best Management Practices*: *3.1 Stormwater Wetlands*. Raleigh, NC. North Carolina Department of Environment and Natural Resources-Division of Water Quality

Hunt, W.F. and Doll, B.A. 2000. *Designing Stormwater Wetlands for Small Watersheds.* North Carolina Cooperative Extension Service Bulletin. Urban Waterfronts Series. AG-599-2.

Backyard Wetlands

Definition/Purpose

Backyard wetlands are constructed systems that mimic the functions of natural wetlands A backyard wetland can temporarily store, filter and clean runoff from driveways, roofs and lawns and thereby improve water quality. The wetland should be expected to retain water or remain saturated for two to three weeks.

Policies

1. Backyard wetlands shall treat no more than 2500 ft^2 of impervious surfaces. Refer to the stormwater wetland practice if the planned practice treats more than 2500 ft^2 of impervious surfaces.

2. If a berm is required to retain water, it should be less than one foot in height. There must be adequate area for flood flows to go around and over the berm.

3. Backyard wetlands shall be placed in low-lying areas where the water table is at or near the ground surface (within one foot). This will ensure proper hydrology within the wetland and provide water for wetland plants during drought conditions.

<u>Specifications</u>

N.C. NRCS, NACD, Wildlife Habitat Council. 1998. *Backyard Conservation: Wetland* (http://www.nrcs.usda.gov/Feature/backyard/pdf/wetland.pdf)

Diversion

Definition/Purpose

A *diversion* means a channel constructed across a slope with a supporting ridge on the lower side to control drainage by diverting excess water from an area to improve water quality. Benefits may include reduced soil erosion, sedimentation and pollution from dissolved and sediment-attached substances.

Polices

1. Diversion may also be used as a component to reduce and/or collect runoff in other BMP systems, such as bioretention areas, stormwater wetlands, critical area, etc.

2. Land smoothing for diversions should be used where existing terraces, diversions or other minor landscape features must be removed prior to initiating a diversion.

3. BMP soil, nitrogen, and phosphorus impacts are required on the contract.

<u>Specifications</u>

N.C. NRCS Technical Guide, Section IV, Specification #362 (Diversion)

Riparian Buffer

Definition/Purpose

A *riparian buffer* is an area of perennial, long-lived vegetative cover (grass, shrubs, trees, or a combination of vegetation types) established adjacent to and up-gradient from watercourses or water bodies to improve water quality. Benefits may include reduced soil erosion and nutrient delivery, sedimentation, pathogen contamination and pollution from dissolved, particulate and sediment-attached substances.

Policies

1. Riparian buffers are applied on areas adjacent to perennial or intermittent streams, rivers, lakes, ponds, and types of wetlands that flood or pond. Field staff shall determine the need and suitability of this practice using visual observation.*

2. The width of the riparian buffer must be a minimum of 15 feet, measured from the top of the bank.

3. Cost share for this practice will only be provided for those buffer areas planted with native shrubs and/or trees.

4. Riparian buffer projects planned for contiguous land parcels are highly encouraged.

5. BMP soil, nitrogen and phosphorus benefits are required to be documented on contracts greater than 50 feet in width.

<u>Specifications</u>

For riparian buffers that are forested and greater than or equal to 35 feet, follow Practice Standard 391 (Riparian Forest Buffer); otherwise, follow Practice Standard 393 (Filter Strip).

NCDENR. 2007. *Stormwater Best Management Practices Manual*: *Riparian Buffers, Chapter 15*. Raleigh, NC. North Carolina Department of Environment and Natural Resources-Division of Water Quality.

*Additional references can include:

- The most recent version of the 1:24,000 scale (7.5) minute quadrangle topographic maps prepared by the United States Geological Survey (USGS).
- The most recent printed version of the soil survey map prepared by NRCS.
- The most recent version of the NCDENR, DWQ Identification Methods for the Origins of Intermittent and Perennial Streams (http://portal.ncdenr.org/web/wq/swp/ws/pdu/protocol).

Refer to Planting Guidelines for Riparian Areas.

Planting guidelines for Riparian Areas

A mixture of trees and shrubs and diverse species selection is preferred.

Spacing:

- Trees: 10-15 feet apart.
- Shrubs: 3-6 feet apart.
- If planting multiple rows, leave 4-6 feet between rows.

If area is currently in grass up to stream edge:

- Mow planting area as short as possible.
- Plant trees and shrubs, removing 2-3 feet of grass around each planting.
- Add 2–4 inches of mulch around each planting.
- As trees and shrubs grow and the canopy closes, they will shade out the grass.

Reduce compaction and site disturbance:

- It is always better to limit the use of heavy machinery within the buffer strip.
- Use shovel, planting bar or auger for seedlings and smaller trees.
- For large tree planting, the use of a mini-skid with auger attachment may be necessary.

For more information, refer to *Riparian & Wetland Tree Planting Pocket Guide for North Carolina*. Forestry NPS Unit. N.C. Division of Forest Resources. September, 2006

Streambank and Shoreline Protection

Definition/Purpose

Streambank and shoreline protection is the use of vegetation to stabilize and protect banks of streams, lakes, estuaries or excavated channels against scour and erosion. This practice should be used to prevent the loss of land or damage to utilities, roads, buildings or other facilities adjacent to the banks, to maintain the capacity of the channel, to control channel meander that would adversely affect downstream facilities, to reduce sediment load causing downstream damages and pollution or to improve the stream for recreation or fish and wildlife habitat.

Policies

1. The use of this BMP for CCAP funding is intended for sites where the natural streambank has been severely damaged by human or animal access, other activities, or natural processes.

2. This practice is not intended to address ocean shoreline erosion problems.

3. A minimum setback of 20 feet of undisturbed native vegetation or restored riparian area adjacent to the installed practice is mandatory in all situations. Division staff is authorized to approve contracts with a lesser setback for instances where site conditions make a 20-foot setback infeasible, but the Division may not approve a setback that is less than 10 feet.

4. This practice may further be supported by other BMPs such as critical area planting and riparian buffer.

5. Additional measures to minimize or manage access or traffic may be necessary to ensure the long-term stability of the streambank/shoreline.

6. This practice is not intended to address situations where in-stream work or armoring of the shoreline or streambank is required.

7. Estimates of streambank/shoreline erosion in tons/yr. may be substituted for soil loss calculations on the contract.

<u>Specifications</u>

N. C. NRCS Technical Guide, Section IV, Specifications #580 (Streambank and Shoreline Protection, #322 (Channel Bank Vegetation), #584 (Channel Stabilization), #612 (Tree/Shrub Establishment), #382 (Fence), #342 (Critical Area Planting), #472 (Use Exclusion), #393 (Filter Strip), #578 (Stream Crossing), NRCS Engineering Field Handbook Chapter 16 (available in Draft from Area Offices).

Stream Restoration

Definition/Purpose

A *stream restoration* system means the use of bioengineering practices, native material revetments, channel stability structures and/or the restoration or management of riparian corridors in order to protect upland BMPs, restore the natural function of the stream corridor and improve water quality by reducing sedimentation to streams from streambank.

Policies

1. The use of this BMP for CCAP funding is intended for sites where the natural streambank has been severely damaged by human or animal access, other activities or natural processes. Each site should be reviewed by the District Board to determine the eligibility for cost share funding and prioritize the sites as to the direct effects, long term benefits and the landowner's willingness to be involved, maintain and support the practice.

2. Planned practices require a contact with the U.S. Army Corps of Engineers and the N.C. Wildlife Resources Commission for all proposed sites to determine if a Section 404 permit is needed. A Section 401 Water Quality certification may also be needed from the N. C. Division of Water Quality.

3. A minimum setback of 20 feet of undisturbed native vegetation or restored riparian area adjacent to the installed practice is mandatory in all situations.

4. An analysis of the existing stream condition and the degree of departure for the existing stream condition from its full operating potential must be made as a part of the planning and design process for this BMP. The analysis of stream condition and departure may be made following the procedures established by Dave Rosgen in *Applied River Morphology*, Chapter 6 (Rosgen, 1996). Rosgen's field survey form, "Summary of Condition Categories for Level III Inventory" may be used to document the analysis.

5. If the analysis, when completed as outlined in item 4 (above), shows that the profile, pattern and/or dimensions of the stream need to be restored in order to restore the natural stability and function of the stream, assistance will be required from a person who has successfully completed Rosgen's Restoration Course or equivalent natural channel design training.

6. Installations of this BMP will be monitored upstream and downstream as necessary to determine the effects and compare the condition of the stream before versus after the installation. Monitoring can include physical measurements, biological/water quality indicator measurements, chemical measurements (WQ sampling) and/or documentation of visual observations. If documented visual observation is the only monitoring technique used, the observations will be mandatory for the first five years after installation. Other monitoring will be conducted for a minimum of three years.

7. This practice may further be supported by other BMPs such as, critical area planting and riparian buffer. In-stream techniques such as weirs, deflectors and other proven practices may also be used to address the stabilization of the streambanks.

8. Additional measures to minimize or manage access or traffic may be necessary to ensure the long-term stability of the restored stream/streambank.

9. Estimates of streambank erosion in tons/yr. may be substituted for soil loss calculations on the contract.

10. Effects:
    - Streambank erosion (required)
    - Runoff and flooding (required)
    - Turbidity (required)
    - Surface water temperature (optional)
    - Stream fish population (optional)
    - Stream benthic invertebrates (optional)

11. Repairs on established sites will require a new analysis to determine the suitability of repairing the BMP before the district can commit funds to a repair CPO.

Specifications

N. C. NRCS Technical Guide, Section IV, Specifications #580 (Streambank and Shoreline Protection), #322 (Channel Bank Vegetation), #584 (Channel Stabilization), #612 (Tree/Shrub Establishment), #382 (Fence), #342 (Critical Area Planting), #472 (Use Exclusion), #393 (Filter Strip), #391 (Riparian Forest Buffer), #578 (Stream Crossing), NRCS Engineering Field Handbook Chapter 16 (available in Draft from Area Offices).

LEVEL III: ASSESSMENT OF STREAM CONDITION AND DEPARTURE
SUMMARY OF "CONDITION" CATEGORIES FOR LEVEL III INVENTORY

Stream name _____ Observers _____
Location _____ Stream Type _____ Date _____
Riparian Vegetation _____ Flow regime _____
Stream Size, Stream order _____ Depositional pattern _____
Meander pattern _____ Debris/channel blockages _____
Channel stability rating (Pfankuch) _____ Altered Channel State: _____

Sediment supply (check appropriate category):
- Extreme _____
- Very High _____
- High _____
- Moderate _____
- Low _____

Streambed (vertical) stability
- Aggrading _____
- Degrading _____
- Stable _____

Width/depth ratio condition:
- Normal (stable) _____
- High _____
- Very high _____

Streambank erosion Potential:

Bank erodibility:	Near-bank stress:
Extreme _____	Extreme _____
High _____	High _____
Moderate _____	Moderate _____
Low _____	Low _____

Dimension/shape:
- Width _____
- Depth _____
- Width/depth ratio _____

Patterns: (*show as funct. of Wbkf):
- Meander length* _____
- Radius of curve* _____
- Belt width* _____
- Sinuosity _____

Profile:
- Water surface slope _____
- Valley slope _____

Bed features:
- Riffle/pool _____
- Step/pool _____
- Conver./divrg. _____
- Plane bed _____
- Other _____
- Spacing* _____

Describe alterations: _____

General Remarks

_____
_____
_____
_____
_____

Attach photographs taken mid-stream looking up and downstream. Make site map.
Attach vicinity map of reach and/or aerial photo for specific location.
Note any permanent cross-section for level IV verification of cross-section stability, actual erosion rates, change in pebble counts, deposition studies, sediment sampling, etc.
Attach copy of: stream classification field form, channel Stability rating form, bank erosion rating form, profiles, cross-sections, pebble counts, etc.

Signature: _____

Cisterns

Definition/Purpose

Cisterns are above or below ground storage tanks for rainwater harvesting systems used to collect and store rainwater. They are intended to reduce stormwater runoff, encourage runoff infiltration and conserve water.

Policies:

1. Cisterns must be placed in accordance with manufacturer's instructions.

2. Cisterns shall be sized to provide 0.5 - 1.0 gallon of cistern volume for each square foot of contributing rooftop depending on the site and the water use demand.

3. Cost share assistance will only be provided for cisterns 250 gallons or larger.

4. Cistern cost share eligibility to receive CCAP funding is based on the existence of a water quality concern. The CCAP checklist must be completed.

5. Agricultural non-point source pollution sources are not eligible, with the exception of runoff from a greenhouse on an educational entity.

6. Any system collecting 3,000 gallons or more requires a PE design, regardless of the number of cisterns and whether or not they are connected.

7. If installing multiple cisterns, cisterns should be connected. If the cisterns are not connected, a written justification is required. This justification will determine whether one or more accessory packages can be approved.

<u>Specifications</u>

Mecklenburg Soil and Water Conservation District Urban Conservation Practice Standard *Code 558-U (Cisterns)*

Pet Waste Receptacle

Definition/Purpose

Pet waste receptacles are designed to encourage pet owners to pick up after their animals in parks, neighborhoods and apartment complexes so as to prevent waste from transported off-site by stormwater runoff.

Policies

1. This practice should only be installed in public areas such as parks, neighborhood common areas and apartment complexes. This practice is not designed for the individual homeowner.

2. Each receptacle must include appropriate signage describing the use and purpose of the receptacle.

3. Community Conservation Assistance Program will not provide cost share assistance on waste bags.

4. A maintenance plan is required for this practice.

<u>Specifications</u>

Mecklenburg Soil and water Conservation District Urban Conservation Practice Standard *Code 311-U (Pet Waste Receptacles)*

Abandoned Well Closure

Definition/Purpose

An *abandoned well closure* is the sealing and permanent closure of a supply well no longer in use. This practice serves to prevent entry of contaminated surface water, animals, debris or other foreign substances into the well. It also serves to eliminate the physical hazards of an open hole to people, animals and machinery. Cost share for this practice is limited to $1,500 per well.

Policies

1. Bored, hand dug and drilled wells may be closed.
2. Cost share may be provided for wells that have been abandoned for over three years.
3. If the abandoned well site is associated with a new development project, it is not eligible to receive cost share assistance.
4. A well abandonment record (GW-30) must be completed by certified well contractor and submitted to the N.C. Division of Water Quality. The well closure must comply with all applicable state and local requirements for well abandonment and closure.
5. Payment will be based on 75% of actual cost with receipts, with the cost to the N.C. CCAP not to exceed $1,500.
6. The BMP must be inspected by district technical staff within 9-12 months following closure to ensure surface water is properly diverted and closure is adequate.
7. Minimum life of BMP is one year.

Specifications:

NRCS Practice Standard 351 – Well Decommissioning
N.C. Administrative Rule: 15A NCAC 2C.0113
N.C. General Statutes 87-83 through 87-99

Marsh Sills

Definition/Purpose

Marsh Sills protect estuarine shorelines from erosion, combining engineered structures with natural vegetation to maintain, restore, or enhance the shoreline's natural habitats. A sill is a coast-parallel, long or short structure built with the objective of reducing the wave action on the shoreline by forcing wave breaking over the sill. Sills are used to provide protection for existing coastal marshes, or to retain sandy fill between the sill and the eroding shoreline, to establish suitable elevations for the restoration or establishment of coastal marsh and/or riparian vegetation.

Policies

1. This practice should only be installed in areas with eroding shorelines or in areas where marsh vegetation alone is not sufficient to stabilize the shoreline.

2. Sills shall always be combined with suitable wetland plantings or installed for the protection of existing coastal marsh and/or riparian vegetation.

3. Sills may be constructed from a variety of materials including, but not limited to granite, marine limestone (marl), concrete, wood, timber, vinyl, steel or bagged oyster shells.

4. A General or Major CAMA Permit (if site conditions do not allow for approval by a General Permit) for a riprap/stone sill or a sheetpile sill must be obtained from the Division of Coastal Management (see References below).

5. Applicants must comply with all applicable state and federal permits for the construction of this BMP, including consent from adjacent riparian property owners, coordination with applicable agencies and specific design conditions.

6. <u>Specific conditions applicable to both riprap/stone sills and sheetpile sills</u>:
   In accordance with the standards in 15A NCAC 07H Section .2700 and/or Section .2100, design conditions that are applicable to this sill BMP include (but are not limited to):

   a. Sill construction shall be limited to a maximum length of 500 feet.

   b. The height of sills shall not exceed six inches above normal high water or the normal water level, or the height of the adjacent wetland substrate, whichever is greater.

   c. The sill shall have at least one five-foot opening, dropdown, or overlap at every 100 feet. Deviation from these drop down requirements shall be allowable through coordination with NC Division of Marine Fisheries and the National Marine Fisheries Service.

d. For water bodies more narrow than 150 feet, the structures shall not be positioned offshore more than one sixth (1/6) the width of the waterbody.

7. Specific conditions applicable to a riprap stone sill:
In accordance with the standards in 15A NCAC 07H Section .2700, sill structures shall be constructed from riprap materials. Section .2700 design conditions that are applicable to this riprap sill BMP include (but are not limited to):

   a. On shorelines where no fill is proposed, the landward edge of the sill shall be positioned no more than 5 feet waterward of the waterward depth contour of locally growing wetlands or to mid-tide depth contour, whichever is greater.

   b. On shorelines where fill is proposed, the landward edge of the sill shall be positioned no more than 30 feet waterward of the existing mean high water or normal high water line.

   c. The riprap structure shall not exceed a minimum slope of 2 horizontal : 1 vertical and a maximum slope of 1.5 horizontal : 1 vertical. The bottom width of the structure shall be no wider than 15 feet.

   d. For the purpose of protection of public trust rights, fill waterward of the existing mean high water line shall not be placed higher than the mean high water elevation.

   e. The sill shall not be within a navigation channel marked or maintained by a state or federal agency.

   f. The sill shall not interfere with leases or franchises for shellfish culture.

   g. All structures shall have a minimum setback distance of 15 feet between any parts of the structure and the adjacent property owner's riparian access corridor, unless either a signed waiver statement is obtained from the adjacent property owner or the portion of the structure within 15 feet of the adjacent riparian corridor is located no more than 25 feet from the mean high or normal high water level.

8. Specific conditions applicable to a sheetpile sill:
In accordance with the standards in 15A NCAC 07H Section .2100, sill structures shall be constructed from timber, vinyl, or steel sheetpile. Section .2100 design conditions that are applicable to this sheetpile sill BMP include (but are not limited to):

   a. The sill shall be positioned no more than 20 feet waterward of the normal high water or normal water level or 20 feet waterward of the waterward edge of existing wetlands at any point along its alignment.

b. Sills authorized under this General Permit shall be allowed only in waters that average less than three feet in depth along the proposed alignment as measured from the normal high water or normal water level.

c. The sill shall be constructed with an equal gap between each sheathing board totaling at least one inch of open area every linear foot of sill.

Specifications

SECTION .2700 – GENERAL PERMIT FOR THE CONSTRUCTION OF RIPRAP SILLS FOR WETLAND ENHANCEMENT IN ESTUARINE AND PUBLIC TRUST WATERS

SECTION .2100 - GENERAL PERMIT FOR CONSTRUCTION OF SHEETPILE SILL FOR SHORELINE PROTECTION IN ESTUARINE AND PUBLIC TRUST WATERS AND OCEAN HAZARD AREAS

Structural Stormwater Conveyance

Definition/Purpose

A *Structual Stormwater Conveyance* includes various techniques to divert runoff from paved surfaces where a vegetated diversion is not feasible. The purpose is to direct stormwater runoff (sheet flow or concentrated) away from a direct discharge point and divert it to an approved BMP or naturally vegetated area capable of removing nutrients through detention, filtration, or infiltration. This may be accomplished through the use of the following: curb cuts, trench drains, raised concrete or asphalt areas in parking lots, earthen berms or check dams.

Policies

1. The impervious surface treatment area must have existed for at least 3 years.

2. Practice is only eligible in situations where runoff from existing impervious surfaces does not flow onto a pervious area and is directed instead to a direct discharge point.

3. Practice is only eligible in situations where the land use does not allow for a vegetated diversion channel to be installed, and additional techniques are required.

4. Structural stormwater conveyance techniques must be directed to an appropriately sized, approved BMP or naturally vegetated area to allow for volume reduction and treatment.

5. The practice shall be sized to convey runoff generated by the peak discharge from the 2 year storm.

6. If installing a downstream BMP, it shall be appropriately sized to treat the volume according to specific program BMP guidelines.

7. If the downstream area is natural and will not be improved, the natural soil should be capable of infiltrating the volume of water generated by the aforementioned storm within 24 hours.

8. Devices shall not promote ponding or detention of runoff on the impervious surface. If placed in a low spot, where excessive head could build up, the device shall be sized for the 10 year storm.

9. Flow shall exit the conveyance in a non erosive manner. This may require outlet protection or other velocity dissipation techniques.

10. Practice must be designed by a Professional Engineer (PE).

11. Treatment of impervious surfaces adjacent to waterways should be given funding priority.

Vegetative Guidelines

The use of native species is strongly encouraged. Invasive or noxious species are prohibited, with the exception of all common turf type grasses.

*[*Refer to *North Carolina Noxious Weeds list* (NCDA & CS, Plant Industry Division - Plant Protection Section) or *Landscaping with Native Plants (*N.C. Cooperative Extension Service Bulletin AG-636-03*)]*

Species selected for seeding or planting shall be suited to current site conditions and intended uses. Selected species will have the capacity to achieve adequate density and vigor within an appropriate time frame to stabilize the site sufficiently to permit suited uses with ordinary management activities.

Species, rate of seeding or planting, minimum quality of planting stock and method of establishment shall be specified before application. Only viable, high-quality seed or planting stock will be used.

Site preparation and seeding or planting shall be done at a time and in a manner that best ensures survival and growth of the selected species. What constitutes successful establishment shall be specified before application.

Fertilization, mulching or other facilitating practices for plant growth shall be timed and applied to accelerate establishment of selected species

Soil amendments will be added as necessary according to a soil test report.

Additional Criteria to Restore Degraded Sites

- If gullies or deep rills are present, they will be treated, if feasible, to ensure proper site and seedbed preparation.

- Required amendments, such as compost to add organic matter and improve soil structure and water holding capacity, or application of lime to increase pH of acid soils, shall be included in the site specifications with amounts, timing and method of application.

CONSIDERATIONS

- Native species or mixes that are adapted to the site and have multiple values should be considered. Refer to Moorman, C, Johns, M. and Bowen, L. 2002. *Landscaping with Native Plants.* N.C. Cooperative Extension Service Bulletin AG-636-03.

- Control or exclude pests that will interfere with the timely establishment of vegetation.

- Inspections, reseeding or replanting, fertilization and pest control may be needed to insure that this practice functions as intended throughout the expected life.

Requirements Common to All Practices

- Sites must have been developed for three years or more to be eligible for cost share assistance and must be released from sedimentation erosion control permits, other than single-family homes.

- Single-family homes should have a certificate of occupancy for three years or more.

- Unless otherwise specified, the minimum life of all practices is 10 years. For single-family home sites, the minimum life of all practices is five years.

- All applicable federal, state and local permits must be obtained prior to contract approval.

- Practice will be cost-shared at a rate of 75 percent of average costs. Copies of receipts must be provided. Actual costs, as indicated by receipts, may be used if average costs are not available.

- To determine project eligibility: The source of the structure or site causing the problem determines eligibility for CCAP. For example, if stormwater from a house is causing the water quality problem on a property, it is eligible for CCAP. If the stormwater causing the water quality problem is from a barn, it is not eligible for CCAP.

- CCAP will not cost-share on practices that are located in the right-of-way, as determined by the NC Department of Transportation (DOT).

- CCAP is eligible to design and cost-share on practices located downstream of the DOT-controlled right-of-way only if the source of the problem in the right-of-way is restored/corrected by the DOT or the landowner, with appropriate permission.

- For practices to be installed in a right-of-way that is controlled by another entity (municipality, homeowners association, developer, etc), written permission must be obtained from the applicable entity.

- Written permission from the applicable entity is required for any construction within a utility or any other type of easement. This permission must include acknowledgement of the 5 or 10 year maintenance period required by the applicant.

- CCAP cost-share is only eligible on backyard rain garden, bioretention area, backyard wetland, or stormwater wetland projects where the proposed BMP size is equal to at least 30% of the recommended design size, as determined by the Simple method.

- Permit fees required for any CCAP BMP are not eligible to receive cost share assistance.